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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,203	02/27/2004	Leonard Forbes	303.356US4	9063

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EXAMINER	
ECKERT II, GEORGE C	

ART UNIT	PAPER NUMBER
2815	

DATE MAILED: 02/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/789,203	FORBES ET AL.	
	Examiner	Art Unit	
	George C. Eckert II	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-59* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *37-51* is/are allowed.

6)☒ Claim(s) *1-36 and 52-56* is/are rejected.

7)☒ Claim(s) *57-59* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *2/27, 9/8&11/24/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1, 3-5, 11, 12, 14-16, 18, 19, 21, 22, 24, 25, 28, 30, 31, 33, 34, 36, 52 and 54-56 are rejected under 35 U.S.C. 102(b) as being anticipated by 4,507,673 to Aoyama et al. Regarding claims 1, 12, 22, 31, 36 and 52, Aoyama teaches in figure 6 forming a memory device comprising a floating gate (storage electrode) 5 of SiC, which has an electron affinity of 3.7 - 3.8 eV, and an insulation layer 4 of SiO_2 which has an electron affinity of 0.9eV such that a barrier energy between them is less than 3.3 eV (3.8 – 0.9 = 2.9 eV). Aoyama also teaches the method of operating the device wherein data is stored by changing charge on the floating gate (col. 5, lines 11-16) and refreshing data based on a data charge retention time that depends upon the barrier energy (col. 5, lines 17-23). Aoyama teaches that a Fowler-Nordheim tunneling charge is stored on the floating gate by an amplified signal between ends of a current path above which the storage electrode is disposed (col. 2, lines 60-66, col. 5, lines 26-28) and that the data is read by detecting a current flow through a current path (the transistor channel) which is based on charge on the storage electrode and transconductance gain from the storage electrode (col. 2, lines 66-68). Aoyama also teaches that less than 12 volts is used to erase the stored charge (col. 3, lines 24-26). It is considered inherent that the method includes a system with a processor to operate the stored data.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 6-10, 17, 20, 26, 27, 29 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over 4,507,673 to Aoyama et al. Though Aoyama taught the device and method of operating the device of claims 1, 12, 22 and 31, Aoyama did not specifically teach the claimed operating parameters such as write/erase times, charge retention times or detected signal strength. However, these limitations are considered either inherent in the device/method of Aoyama or obvious there over. The limitations are considered inherent because they are dependent on the materials/barrier energy for the floating gate and insulator. Because Aoyama teaches the materials as instantly taught by applicant and thus achieves a device having the claimed barrier energy, the claimed operating parameters, which are dependent on the barrier energy, are considered inherent. Alternately, the claimed operating parameters are considered merely optimization of that which is known in the art. Faster operation of a device by means of e.g. write/erase times achieves quicker and thus improved performance. As such, the limitations are considered obvious.

3. Claims 2, 13, 23 32 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoyama et al. in view of 5,032,883 to Wakai et al. Aoyama taught the device and method of claims 1, 12, 22, 31 and 52 but did not teach the device further comprising an insulator having

a permittivity higher than that of silicon dioxide. Wakai teaches that it is known in the art to form a transistor in which a SiC active layer is separated from its gate electrode by either silicon dioxide layer or a silicon nitride layer (col. 5, lines 45-62). The use of silicon nitride in place of silicon dioxide is considered a substitution of an equivalent material and for that reason is not patentable.

Allowable Subject Matter

4. Claims 37-51 are allowed. Claims 57-59 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter: the prior art does not teach or suggest, either alone or in combination, a method of operating a memory device which has the electron affinity and barrier energy as instantly claimed, in combination with the additional operating steps and structural elements as claimed.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George C. Eckert II whose telephone number is (571) 272-1728.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

GEORGE ECKERT
PRIMARY EXAMINER